Notebook Series -- Notebooks by Experimenters Other Than Edison
Phonograph Record Experiments -- F. Detlef Disc Books
Notebook, N-20-01-05

This notebook was used by F. Detlef, Jr., during January-September 1920 as a daily record of analysis of electrolytes used in disc record plating. Detlef took samples and calculated specific gravity, acidity, and the amount of nickel, copper, iron, and aluminum. Inserted into the book are two notes by Edison regarding items to which he wanted Detlef to pay attention. Detlef refers to Edison's oversight at several points with phrases such as "Mr. Edison says" or "keep Mr. Edison informed." There are also references to work by Ludwig F. (Louis) Ott, as well as some loose notes [not selected] in Ott's hand. The flyleaf is marked "F. Detlef Book #2 - on Electrolyte Control for the Disc Record plating dept." The pages are unnumbered. Approximately 125 pages have been used.

The entries from January have been selected as a representative sample. Several loose notes by Edison have also been selected.

F. DeTLef

Book #2 - on Electrolyte Control for the Disc Record plating dept.

Standard Solutions
Made Jan. 7, 1920.

N/10 $K_2Cr_2O_7$ = 1 c.c. = 0.005625 gms Fe

N/10 $Na_2S_2O_3$ - 1 c.c. = 0.006866 gms. Cu
1 c.c. = 0.006484 gms. H_2O_2

$AgNO_3$ solution - 3 gms $AgNO_3$ per liter
that is 1.9050 gms Ag per liter
KCN that is 1.9050 x .27193 = 0.5180 266 5 N per liter
KCN Sol = 1 c.c. = 0.012238 gms. Ni = old sol.
New KCN Sol. 1/7/20
47.4 = 4.0 c.c. KCN } 11.85 $AgNO_3$ = 1 c.c. KCN
47.4 = 4.0 c.c. KCN }
1 c.c. KCN = .0061386
KCN sol. 5/5/20 1 c.c. KCN = 12.75 c.c. $AgNO_3$
1 c.c. KCN = .0066048 gms Ni

NaOH 1/2 Normal = 0.02972 gms H_2SO_4 for 1 c.c.
(E.E.D's solution)

KCN Sol.

44.0 = 4 c.c.

1 cc. KCN. = 11 c.c. $AgNO_3$

1 c.c. KCN. = .0056983 grms. Ni

Normal NaOH — Normal H_2SO_4

25.00 c.c. = 25 cc

25.00 c.c. = 25 c.c.

E.E.D. H_2SO_4 = Normal NaOH

26.50 c.c = 25.00 c.c.

26.50 c.c. = 25.00 c.c.

E.E.D. .0553 grams H_2SO_4 = 1.0304 Normal.

25 : 26.5 :: 1.0304 : X = my NaOH + H_2SO_4 is 1.0922 Normal.

My solution 1 c.c. $\begin{cases} H_2SO_4 \text{ or} \\ NaOH \end{cases}$ = $\begin{cases} 0.04370 \text{ grams NaOH} + \\ 0.05356 \text{ grams } H_2SO_4 \end{cases}$

9.9

.05354) 1.00000.0
48186
518140

18.9

.05354) 1.00000
13354
46460
42832
3628.0

19 c.c.

These solutions made week of Aug 16-21, 1920.

Normal H_2SO_4 = 1.c.c = .04370 grams NaOH
Factor = 1.0922 1cc = .05356 grams H_2SO_4

Normal NaOH = 1c.c. = .05356 grams H_2SO_4
Factor = 1.0922 1c.c = .04370 grams NaOH.
1c.c. = .06556 grams Acetic acid

N/10 NaOH: made from the Normal NaOH
1c.c. = .005356 grams H_2SO_4
1c.c. = .004370 grams NaOH.
1cc. = .006556 grams Acetic Acid

N/10 $Na_2S_2O_3$ - 1c.c. = .006945 grams Cu_2
Factor = 1.0925 1c.c. = .006558 grams Acetic Acid
1cc = .005358 gms H_2SO_4

KCN solution - 4c.c. KCN = 42.7 c.c. AgNO3.
∴ 1c.c. KCN = 10.67 c.c. AgNO3
∴ 1c.c. KCN = 0.0055273 grams Ni.

Sample Taken Jan. 15, 1920
9 a.m.

Cu. = 0.3 c.c. $Na_2S_2O_3$ 100 c.c. Sample.
.00686 X .3 X 10 = .021 gms.

Ni = 50 c.c. diluted to 200 → 50 c.c.
Taken = 5 c.c. sample.
43.15 c.c. $KCN_{(1)}$
.01 22 38 X 43.15 X 200 = 105.614 gms. Ni.

Acidity = 6.5 c.c. $Na_2S_2O_3$ 25 c.c. Sample.
.00648 X 6.5 X 40 = 1.686 gms.
$HC_2H_3O_2$

Iron = 12.563
12.543
.0198 $(Fe)_2O_6$
1 c.c $K_2Cr_2O_7$ = .0056 25 X 10 = .056

Aluminum = 100 c.c. Sample
.0198
− .0080 Fe_2O_3
.0118 Al_2O_3
.5303
4.24
5303
5303
.0062 5754 Al. X 10 = .063 Al

Sample Taken Jan. 15, 1920
9 a.m.

Spec. Grav. = 1.267
Acidity = 1.686 gms. $HC_2H_3O_2$ per liter
Nickel = 105.614 gms. per liter
Copper = .021 gms. per liter
Iron = .056 gms. per liter
Aluminum = .063 gms. per liter

Sample taken Jan. 7, 1920
at 8.45 A.M.

Cu = 0.15 c.c. $Na_2S_2O_3$ x 10 x .006866 =
.010 gms. Cu per liter

Ni = 44.45 KCN.
44.40 KCN.

Acidity = 7.45 c.c. $Na_2S_2O_3$
.06484 x 7.45 x 40 =

Iron 12.5783
12.5390
.0393 $(Fe,Al)_2O_3$
3.5 cc $K_2Cr_2O_7$ x .0056 25 x 10 = 0.2000
.0200 x 1.4298 = .0286

Alum
.0393
-.0286
.0107
.5303
3321
3321
.005674721 x 10 = .057

Sample taken Jan. 7, 1920
at 8.45 A.M.

Spec. Grav. = 1.277
Acidity = 1.93 gms. $HC_2H_3O_2$ per liter
Nickel = 109.083 " per liter
Copper = .010 " " "
Iron = .200 " " "
Aluminum = .057 " " "

14.8742
14.5416
.3326 Ni glycocine
.2032
6652
9978
6650
x06.75843 = Ni in 0.625 c.c. sample
x 1600
40550592
67583 2
108.13491 gms Ni per liter

Sample taken Jan. 9, 1920
at 8.30 A.M.

Cu = 0.2 cc $Na_2S_2O_3$ X 10 X .006866 =
.014 gms Cu per liter

Ni = 48.2 cc - 5 c.c. = 47.8 c.c. KCn.
48.200 - 4 c.c. = 47.86
47.83 c.c. KCn.
47.83 X 400 X .0061386 = 117.444

Acidity = 6.1 c.c. $Na_2S_2O_3$
6.1 X .006484 X 40 = 1.582

Iron = 12.5476
12.5368
.0108 $(FeAl)_2O_3$
1.1 c.c. $K_2Cr_2O_7$ X .005685 X 10 = .062

Alum = .0108 $(FeAl)_2O_3$
- .0088 Fe_2O_3
.0020 Al_2O_3 X .5303 X 10 =
.011 Al

Sample taken Jan. 9, 1920
at 8.30 A.M.

Spec. Grav. = 1.296
Acidity = 1.582 gms Acetic per liter
Nickel = 117.444 gms per liter
Copper = .014 " " "
Iron = .062 " " "
Aluminum = .011 " " "

Sample taken Jan. 12, 1919
at 9.15 A.M.

Cu = 0.10 c.c. $Na_2S_2O_3$ x .006866 x 10 =
0.007 gms. Cu.

Ni = 43.5 − .5 = 43.0 c.c. KCn.
43.0 x 400 x .006186 =

Acidity = 6.15 c.c. $Na_2S_2O_3$ x 40 x
.006484 = 1.595 gms. $HC_2H_3O_2$

Iron = 12.5456
12.5370
.0086 (Fe+Al)$_2O_3$
0.925 c.c. $K_2Cr_2O_7$ x .005615 x 10 = .052
.0052 x 1.4298 =

Alum = .0086 (Fe+Al)$_2O_3$
− .0074 Fe_2O_3
.0012 Al_2O_3
x .5303
.000636 x 10 = .006

Sample taken Jan. 12, 1919
at 9.15 A.M.

Sp. Gr. = 1.267
Acidity = 1.595 gms. $HC_2H_3O_2$ per liter
Nickel = 105.584 gms. per liter
Copper = .007 " " "
Iron = .052 " " "
Aluminum = .006 " " "

Sample taken Jan. 14, 1920
at 9:00 A.M.

Cu = .10 c.c. $Na_2S_2O_3$ X .0068666 X 10 =
.007

Ni = 46.05 − 10.00 = 45.21
45.21 X .0061386 X 400 = 111.010

Acidity = 6.70 c.c. $Na_2S_2O_3$ X 40 X
.00684 =

Iron = 12.5516
12.5364
.0152

0.8 c.c. $K_2Cr_2O_7$ X .00525 X 10 = .045

Alum " .0152
.0064
.0088 .5303 X 10 = .047

Sample taken Jan. 14, 1920
at 9:00 A.M.

Sp. Gr. = 1.280
Acidity = 1.738 gms $HC_2H_3O_2$ per liter
Nickel = 111.010 gms. per liter
Copper = .007 gms. " "
Iron = .045 " " "
Aluminum = .047 " " "

67
4
268

.00684
268
5187
38904
1368
1.73771

1.4298
.045
71490
5792
.0643410

.00525
.8
.0045000
.0088
.5303
4424
4424
.0046664

Sample Taken Jan. 16, 1920
at 9.45 A.M.

Cu = 0.075 X .006866 X 10 = .005 gms.

Ni =
42.00 - 4.3 = 41.64 c.c. KCN
41.64 X 400 X .0061386 = 102.245 gms.

Acidity = 5.9 c.c. $Na_2S_2O_3$
5.9 X 40 X .006484 = 1.530

Iron = 12.5436
12.5370
.0066

0.75 c.c. $K_2Cr_2O_7$ X .005625 X 10 = 0.042
.0042 X 1.4298 = .0060

Alum = .0066 $(AlFe)_2O_3$
.0060 Fe_2O_3
.0006 Al_2O_3
.5303
.00031818 X 10 = .003

Sample taken Jan. 16, 1920.
at 9.45 A.M.

Sp. Gr. = 1.258
Acidity = 1.530 gms $HC_2H_3O_2$ per liter
Nickel = 102.245 gms. per liter
Copper = .005 gms " "
Iron = .042 " " "
Aluminum = .003 " " "

.36
1185) 430.000
355 55
2450
3110

.006484
.36
38904
19452
12968
1.530224

.006866
.75
34330
48262
.0051695 0
1.4298
.0042
28596
57192
.00600516

.0061386
41.64
245544
368316
61386
245544
2556 11304
400
102.2445

59
X
236
.006484
236
38904
19452
12968
1.530224
.005625
7.5
28125
39375
.042187 5

Sample taken Jan. 19, 1920
at 8.45 A.M.

Cu = 0.05 c.c. $Na_2S_2O_3$ X .006866 X 10 =
.003

Ni = 46.55 - 1.0 c.c. = 46.47 c.c.
46.47 X .0061386 X 400 = 114.104

Acidity = 6.00 c.c. $Na_2S_2O_3$ X 40 X
.006484 = 1.556

Iron = 12.544
12.5364
.0078 $(Fe,Al)_2O_3$

0.90 c.c. $K_2Cr_2O_7$ X 10 X .0056 = .051
.0506 X 1.4298
Alum = .0078 $(Fe,Al)_2O_3$
-.0072 Fe_2O_3
.0006 X 10 = .006 Al_2O_3
.0060 X .5303 = .003 Al

Sample taken Jan. 19, 1920
at 8.45 A.M.

Sp. Gr. = 1.284
Acidity = 1.556 gms. Acetic per liter
Nickel = 114.104 gms per liter
Copper = .003 " " "
Iron = .051 " " "
Aluminum = .003 " " "

.0056
.9
.0506
1.4298
.4050000
.4556
1012
2025.0
506
.0723836

Sample Taken Jan. 1, 1920
at 9:00 A.M.

Cu = .05 x .006866 x 10 = .003

Ni = 40.5 - 7.7 = 39.85 c.c.
x .0061386 x 400 = 97.849

Acidity = 5.70 c.c. x 40 x .006484 = 1.478

Iron = 1.5465
1.5358
.0107 (Fe_2O_3)

0.9 c.c. x 10 x .005625 = .051
.0506 x 25 x 1.4298

Alum = .0107 (Fe_2O_3)
.007 Fe_2O_3
.0035 Al_2O_3 x 10 =
x .5343
.019

Sample Taken Jan. 1, 1920.
at 9:00 A.M.

Sp. Gr. = 1.248
Acidity = 1.478 gms. acetic per liter
Nickel = 97.849 gms. per liter
Copper = .003 " " "
Iron = .051 " " "
Aluminum = .019 " " "

Sample taken Jan. 23, 1920
at 9:00 A.M.

Cu = 0.05 x .006666 x 10 = .003

Ni = 46.25 - 8.00 = 45.57
x .006136 x 400 = 111.894

Acidity = 6.60 x 40 x .006484 = 1.712

Iron = 12.5552
12.5360
.0192

2.2 c.c. x 10 x .00562 5 = .124
.123750 x 1.4298 ÷ 10 = .0177

Alum =
.0192
.0177
.0015 Al_2O_3
.5303
26515
5303
.00079545 x 10 = .008

Sample taken Jan. 23, 1920
at 9:00 A.M.

Sp. Gr. = 1.279
Acidity = 1.712
Nickel = 111.894
Copper = .003
Iron = .124
Aluminum = .008

Sample taken Jan. 26, 1920

Cu = 0.10 X .006866 X 10 = .007

Ni = 49.30 - 4.0 = 48.96 c.c.
48.96 X .0061386 X 400 = 120.218

Acidity = 7.60 c.c. X 40 X .006484 = 1.971

Iron =
12.5488
12.5362
.0126

1.45 c.c. $K_2Cr_2O_7$ X 10 X .005625 = .082
.008156 X 1.4298 =
Alum = .0126
.0117
.0009
.5303
.0004772 X 10 = .005

Sample taken Jan. 26, 1920
at 9.00 A.M.

Sp. Gr. = 1.296
Acidity = 1.971 gms. Acetic Acid per liter
Nickel = 120.218 gms per liter
Copper = .007 " " "
Iron = .082 " " "
Aluminum = .005 " " "

11.85) 400.0 (1.33
3555
4450
4896
4
19584
76
4
304
.006484
304
25936
194520
1.971136
.008156
1.4298
65248
73404
16312
32624
8156
.011661 4488

.0061386
19584
245544
491088
306930
552474
61386
120.218 3424

.005625
14.5
281250
225000
56250
.0815625

Sample taken Jan. 29, 1920
at 9.15 A.M.

Cu. = 0.10 x .006866 x 10 = .007

Ni = 46.45 - 4.50 = 46.07 c.c.
x 400 x .006386 = 113.12

Acidity = 6.80 c.c. x 40 x .006484 =
1.764

Iron = 12.55
12.3358
.0164 (Fe)$_2$O$_3$
1.40 c.c. x 10 x .0056 25 =
.07875 x 1.4298

Alum = .0164
.0113
.0051 Al_2O_3
x .5303
5303
26515
.0027045 x 10 = .027

Sample taken Jan. 29, 1920
at 9.15 A.M.

Sp. Gr. = 1.278
Acidity = 1.764
Nickel = 113.12
Copper = .007
Iron = .079
Aluminum = .027

68
4
272

.006484
272
12968
45388
12968
1.763648

.005625
14
22500
5625
.07875
1.4298
63000
70875
15750
31500
78750
1.1125967500
.0713

[ITEM(S) FOUND IN BOOK]

Delter —

All big Nickel baths went bad last night due to Copper —

Got Doughtery up here & found 1.81 Mlg per Liter — Why haven't you seen this coming from your daily tests —

Ed

[ITEM(S) FOUND IN BOOK]

Use round the Corner

Cathode + Stirrer

No break wheel –

2½ amperes for 8 hours

D

.006866

3.95

34.39

63.98

~0.5

0.73 ~ 0.70

0.73

0.73

[ITEM(S) FOUND IN BOOK]

Req Sol—

1 4 hours
8 "
16 "

Make up Sulfate Copper 250 grams per liter
with 2 grams of H_2SO_4

2
8 } grams per liter H_2SO_4
12

each put 3 way— 4 & 16 hrs

3 in without cond
4 8 & 16 hours

[ITEM(S) FOUND IN BOOK]

.48823
4.4792
97646
439407
341761
195292
195292
2.18.68799816
50
109.34

K.C = .00683895178 N.
895.84
2735
54704
34190
61542
54704
6.125753 92

6 grams Ag_2NO_3 in 1000
1.9050 grams Ag " "
2
3.8100

.27193
3.81
27193
217544
81579
1.0010360533
26.4
4144 2132
6216198
2072066
4 | .0273518071 2
~~.00273~~
.00683795178 N.

.006838
71.4
27352
6838
4.7866
.488233 2
4.4792

[ITEM(S) FOUND IN BOOK]

Get Sample of Distilled Water
from Bld. 22 Mr Aylsworth knows
about it and test it for Mr. Edison's
Request.
Keep the Glycerin Bottles filled up
there is a can under Mr Edisons Bench
and two more cans which have arrived

Get Mr. Redford Report to Mr Andrews
and to Mr. Edison the Free Acid
and buffer in the Nickel Baths also
Your report to Mr. Edison and one
copy to Mr Allingaster.

[ITEM(S) FOUND IN BOOK]

I have Six Solutions of Rubber in different solvents Xylol Toluol, Penta chloethane, Monochlorbenzol Dichlorethylene Chloroform each had 15 g Rubber but added 10 more making 25 g. Stir 4 hours in the new stirrer then take Viscosity which should be around 18 seconds then give to Fred Ott.

18 seconds is Standard from Solution of Combination.